

Math 300: Introduction to Abstract Mathematics – Fall 2009

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Course Web Page: <http://www.math.utk.edu/~finotti/f09/m300/M300.html>
(Careful with lower and upper case letters!)

Textbook: W. Wade, “Math 300: Introduction to Abstract Mathematics”, printed by Graphic Creations.
Prerequisite: Math 142 or Math 148.
Class: MWF 11:15am-12:05pm at HBB 103. (Section 1.)
Midterms: 09/30 (Wed) and 11/04 (Wed) during regular class time.
Final: 12/09 (Wed) from 12:30pm to 2:30pm.
Grade: 25% for quizzes/HWs, 20% for each midterm, 35% for the final.
Note the weight of the quizzes/HWs!

Course Description

Math 300 is a basically a course on *mathematical proofs*. A proof is a series of logical steps based on predetermined assumptions to show that some statement is, beyond all doubt, true. Thus, there are two main goals: to teach you how think in a logical and precise fashion, and to teach how to properly communicate your thoughts. Those are the “ingredients” of a proof.

So, the topics of the course themselves play a somewhat secondary role in this course, and there are many difference possible choices. On the other hand, since these will be your first steps on proofs, the topics should be basic enough so that your first proofs are as simple as possible. Therefore, you will be dealing at times with very basic mathematics, and will prove things you’ve “known” to be true for a long time. But it is crucial that you do not lose sight of our real goal: do you know how to *prove* those basic facts? In fact, the truth is that you don’t really *know* if something is true until you see a proof of it! You might *believe* it to be true, based on someone else’s word or empirical evidence, but only the proof brings certainty.

In any event, the topics to be covered in this course are: logic, set theory, relations and functions, induction, and properties of the real numbers.

This course is clearly crucial to mathematicians, as our job is to prove things (and find things to be proved). But, this is a course also required for computer scientists, not only here at UT, but virtually everywhere. The most obvious reason is that computer programs are written using formal logic. Another relevant connection is *Artificial Intelligence*, where you basically have to “teach” a machine to come up with its own proofs.

Moreover, the skills taught in this course are universally important, and their benefits cannot be overstated! Everyone should be able to think clearly and logically to make proper choices in life, and you should be able to communicate your thoughts clearly and concisely if you want to convince, teach, or explain your choices to someone else. In particular, Law Schools are often interested in Math Majors, as the ability to think logically and clearly develop an argument is (or should be) the essence of a lawyer’s job.

Course Structure

We will try to cover as much as possible of the text, but I'd like to cover at least the first 5 chapters. *On the other hand, I might, and likely will, deviate from the book.* I might just change the order of things a bit, but I might even change some topics, in which case your class notes would be quite important.

Homework and Quizzes

Homeworks will be assigned after every class and will be posted at the section Homework of the course page (address above). No paper copy of the HW assignments will be distributed in class. **It is your responsibility to check the course page often!** Besides HW assignments, other important information will be posted there. (Check the section Important Notes often!)

The HWs will be due on Wednesday, when you will either turn in your HW or take a quiz on problems taken directly from the HW set due on that day. In the former case, two or three problems will be graded and count the same as a quiz. In the latter, the HW will not be collected at all. **You will not know in advance if the HW will be collected or if there will be a quiz,** and hence you should be prepared for either one.

The quizzes will take place at the *beginning* of the class. **You will not have extra time if you are late.** You will have only ten or fifteen minutes to take a quiz, and so if you hadn't already solved the HW problems, you might not have enough time to come up with a solution. **Note that you will also be graded on how well it is written, not only if it is correct!** (Remember, how to communicate your proofs is part of the course.) The same applies to exams and all graded work!

Points will be taken from messy solutions in all assignments, and you need to show work in all questions (unless stated otherwise)! (This same applies to quizzes, HWs, exams and all graded work!)

Calculators will not be allowed! (This includes HW, quizzes, and exams!) As you will see, you won't miss them either.

I will do my best to post solutions to the most difficult problems. If I do, they will be posted in the course page.

In my opinion, doing the HW is one of the most important parts of the learning process, so the weight for them is greater than the weight of a single midterm, and I will assume that you will work very hard on them.

Also, you should try to come to my office hours if you are having difficulties with the course. I will do my best to help you. Please try to come during my *scheduled* office hours, but feel free to make an appointment if that would be impossible.

Finally, **it is your responsibility to keep all your graded Quizzes, HW, and Midterms!** It is very important to have them in case there is any problem with your grade. You can check all your scores at Blackboard. (Blackboard will be used *only for scores*. This is the official site for the course.)

Missed Work

There will be no make-up quizzes or exams. If you miss a quiz or exam **and have a properly documented reason**, your final will be used to make-up your score.

E-Mails

You will have to check your e-mail at least once a week, preferably daily. I will use your e-mail (given to me by the registrar's office) to make announcements. (If that is not your preferred address, please make sure to forward your university e-mail to it!) I will assume that any message that I sent via e-mail will be read in a week or less, and it will be considered an *official* communication.

Feedback

I have an *Online Feedback Form* at

<http://www.math.utk.edu/~finotti/php/feedback.html>

where you can anonymously send me your comments and suggestions. I will consider your comments and try to do whatever I can to resolve possible problems before it is too late. So, please, feel free to use it whenever you have any constructive comment or suggestion. (In fact, I would greatly appreciate it.) If you don't want your comments to be anonymous, just send me an e-mail or come by my office and we can discuss the problem.

Problems *Likely* To Be Assigned

This list is subject to change without prior notice. The official assignments will be posted at our course page.

Pg. 8: 1, 2, 3, 4, 5, 7.

Pg. 12: 8(a), 9(a), 10, 12, 15, 16, 17.

Pg. 17: 22(a), 24(c) (you should also do 24(a) and (b), but do not turn them in), 25(b), 26, 28(a), (b), (c).

Pg. 20: 29, 31, 32, 33, 36, 37.

Pg. 24: 1, 2, 3(a), (b).

Pg. 28: 4, 5(d), (e), 6.

Pg. 28: 7, 9, 10.

Pg. 33: 1(a), (b), (c), 2, 3, 4(a), 5, 6(b).

Pg. 38: 8(a), (c), (e), (f), 9, 10.

Pg. 44: 1, 3, 4, 5.

Pg. 46: 7, 9, 10, 12, 13.

Pg. 49: 14, 16, 17, 19.

Pg. 53: 39, 40, 41, 44, 45.

Pg. 56: 46, 47, 48, 49, 50, 52.

Pg. 60: 1 to 8.

Pg. 64: 10, 11, 12, 15, 17, 25, 27.

Pg. 66: 29(a), (c), (d), 30, 33, 35, 41, 43.

(And maybe more!)

Legal Issues

Conduct. All students should be familiar with and maintain their *Academic Integrity*: from *Hilltopics 2009/2010* (http://dos.utk.edu/files/hilltopics_09-10.pdf) pg. 40:

Academic Integrity

Study, preparation and presentation should involve at all times the student's own work, unless it has been clearly specified that work is to be a team effort. Academic honesty requires that the student present his or her own work in all academic projects, including tests, papers, homework, and class presentation. When incorporating the work of other scholars and writers into a project, the student must accurately cite the source of that work.

All students should follow the *Honor Statement*: from *Hilltopics 2009/2010*, pg. 11:

Honor Statement

"An essential feature of The University of Tennessee is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity."

You should also be familiar with the *Classroom Behavior Expectations* found at

<http://www.math.utk.edu/Courses/Expectations.pdf>.

Disabilities. Students with disabilities that need special accommodations should contact the *Office of Disability Services* (<http://ods.utk.edu/>) and bring me the appropriate letter/forms.

Sexual Harassment and Discrimination. For *Sexual Harassment* and *Discrimination* information, please visit the *Office of Equity and Diversity* at <http://oed.admin.utk.edu/> and check

http://oed.admin.utk.edu/docs/complaint_sex_harass.pdf (Sexual Harassment)

<http://oed.admin.utk.edu/docs/DiscrimCompProc.pdf> (Discrimination)